



13281 U.S. PTO  
031104

## LINK ASSEMBLY FOF CONNECTORS

### FIELD OF THE INVENTION

The present invention relates to a link assembly for connectors, more particularly to a two-terminal connector or a three-terminal connector having a ground terminal passing in and out a main body of the connector as needed. Further, the present invention may comprise a latch device to serve as a basis for turning round the live and neutral terminals, so that the live and neutral terminals cannot be used if the ground terminal has not passed in or out the connector.

### BACKGROUND OF THE INVENTION

In general, the design of a prior-art power circuit uses a plug-and-socket relation for an electric connection to supply power supply to a household electric appliance. Such application is generally used in many countries of the world. The only difference resides on the shape and width of the plugs and sockets.

A plug usually comes with two conductive plates or terminals extended outward for being inserted into a socket hole of a socket. Undeniably, the tight attachment of the two determines the quality of circuit connection; if the attachment is too loose, the conductive plates will be separated from the socket hole easily. Therefore, attention should be paid to the tight attachment for a secured connection.

Based on the safety consideration, it is necessary to have a ground wire or a ground bracket with the grounding effect on the live and neutral plugs or socket as required in many countries such as England and the United States to prevent electric leakage.

Since the safety specifications for plugs and sockets in different countries are different, therefore connectors are divided into 2-terminal connectors and 3-terminal connectors. However, the plug and socket manufacturers usually build a ground terminal on the connector to avoid a high inventory of different extension

cords. However, such ground terminals cannot be plugged into the sockets in some countries such as Taiwan and Japan, because there is no ground socket hole for the insertion. Therefore, the design for adapting both 2-terminal and 3-terminal connections comes into place, but the length of the connector after inserting the 5 adaptor will be increased greatly. The increased weight of the connector also causes the connector to fall off from the socket easily. Another solution is to cut off the ground terminal for disabling the grounding function.

Further, in order to avoid the exposure of the live and neutral terminals from the power cables and extension cords for some traveling electric appliances such 10 as an electric razor or an information product, the terminals are designed in an U-shape or contractible form, so that the terminals can be extended outside or withdrawn inside. However, some countries like the United States have strict safety specification on sockets with grounding wire holes. In other words, if the ground terminal is not extended outside, the live and neutral terminals cannot be plugged. 15 Therefore, designing a link assembly to meet the requirements of such specification is a subject for connector manufacturers.

#### SUMMARY OF THE INVENTION

In view of the shortcomings of the prior art as described above, the inventor of the present invention based on years of experience on designing and selling plugs 20 and sockets to conduct researches and experiments to overcome the foregoing shortcomings, and finally invented the "LINK ASSEMBLY FOR CONNECTORS" in accordance with the present invention.

The primary objective of the present invention is to provide a link assembly for connectors, comprising: a main body having a guide channel on one end surface, a 25 positioning channel at both ends of the guide channel, a terminal channel disposed at both vertical sides of the guide channel, and a ground wire hole disposed between the two terminal channels; a live terminal and a neutral terminal having an insulated axle rod installed at both ends of the live and neutral terminals and

connected to the interior of the main body such that the two terminals can be turned round and extended out of the terminal channel, wherein at least one latch is extended from the rear side of the axle rod; a ground terminal, having an insulated base installed at one end of a ground terminal, a latch groove along the longitudinal direction, and a blocking member protruded from the bottom; a push rod, having a resilient member coupled to the bottom of the push rod and inserted into the latch groove, at least one support member protruded from the upper wall of the rod corresponding to the positioning channel; so that the live terminal and the neutral terminal are bent directly under the terminal channels and turned round to extend out from the terminal channel and constitute a 2-terminal connector; or the push rod being pushed to drive the support member to move down in the positioning channel and press on the inner wall of the terminal channel and push the support member forward to another end of the positioning channel. The support member is latched by the extension of the resilient member, and the ground terminal is extended out from the ground wire hole, and the live terminal and the neutral terminal are turned round and extended out from the terminal channels such that the latch presses the support member to constitute a 3-terminal connector.

The secondary objective of the present invention is to provide a link assembly for connectors, further comprising a latch device installed at the opening of the ground wire hole between the terminal channels and being sheathed into a seal lid by a contractible member and one side of the blocking plate is extended out from the plate groove of the seal lid to shut a terminal channel. An aslant surface is disposed on the contractible member; a resilient member is coupled indirectly to the stop latch on other side of the seal lid; a sliding member is protruded from the base of the ground terminal corresponding to the aslant surface. The sliding member moves forward and touches the aslant surface to moves its side such that the blocking plate is withdrawn into the seal lid to open the terminal channel and turn the live terminal and the neutral terminal round towards the outside.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded view of the connector according to the present invention.

FIG. 2 is a cross-sectional view of the assembled structure of the connector as depicted in FIG. 1.

5 FIGS. 3a and 3b are cross-sectional views of the according to the present invention before and after it is operated respectively.

FIGS. 4a to 4e are side views and front views of the operating procedure according to the present invention.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

10 To make it easier for our examiner to understand the objective of the invention, its structure, innovative features, and performance, we use a preferred embodiment together with the attached drawings for the detailed description of the invention.

15 Please refer to FIGS. 1 and 2 for the connector according to the invention, which comprises a main body 1, a live and neutral terminal module 2, a ground terminal module 3, a push rod 4, and a latch device 5.

The main body 1 is a base for accommodating and mounting the live and neutral terminal module 2, ground terminal module, push rod 4, and latch device 5. In the figure, the main body 1 comprises an upper casing 11 and a lower casing 12  
20 coupled with each other, and a connector module 13 comprised of live and neutral wire insert holes 131, 132 and a ground wire insert hole 133 for receiving the live and neutral terminal and the ground terminal of other plug and being in contact with the internal live and neutral terminals 14, 15 and ground terminal 16, so that the main body 1 acts as an extended connector. However, such extended connector is  
25 a prior art, and thus will not be described here.

The technical characteristics of the invention reside on that a guide channel 17

is disposed on top surface of the main body 1 proximate to an end coupled to the connector module 13 corresponding to the push rod 4, and a terminal channel 18 is extended downward from both sides at the front of the guide channel 17, and a positioning channel 171 is formed at both ends of the guide channel 17, such that  
5 the push rod 4 can be protruded for the latch, and the ground terminal 31 can be movably positioned for extending the ground terminal 31 outside or withdraw it inside. A live terminal 21 and a neutral terminal 22 are accommodated and fixed into the two terminal channels 18, and the two terminals 21, 22 can be turned round to be erected vertically from the bottom of the terminal channel 18 for the electrical  
10 connection. In particular, a ground wire hole 181 is disposed between the two terminal channels 18 for extending or drawing the ground terminal 31.

The end of a live terminal 21 and a neutral terminal 22 in the live and neutral terminal module 2 are pivotally coupled to an axle rod 23, and an axle ring 231 is formed at each end for connecting the two circular concave axle arcs 241 of a limit  
15 press board 24 such that a long protrusion 232 is protruded from the bottom of the axle ring 231, and both live and neutral terminals 21, 22 can be turned round 90 degrees. In addition, two press latches 233 are protruded from the bottom of the axle rod 23 to constitute a link relation with the base 32. Further, the limit press board 24 is disposed between the upper casing 11 and the lower casing 12 to limit  
20 the position of the live and neutral terminals 21, 22, thus the live and neutral terminals 21, 22 will not deviate from their positions when they are turned round, and the live and neutral terminals 21, 22 and the connecting plates 14, 15 are in contact with each other by means of a relay plate 14, 15 for supplying electric power to the connector module 13.

25 The ground terminal module 3 disposed on a base 32 comprises a ground terminal 31 at its end, a pair of clamping plates 311 protruded laterally from the base 32 for clamping the ground wire connecting plate 16 to constitute an electric connection, a through latch channel 321 disposed vertically on the base 32, a T-shape blocking member 322 protruded from the bottom, and a sliding member

323 protruded from the side of the base 32. Further, the ground terminals 21, 22 are turned round 90 degrees and both press latches 233 of the axle rod 23 press against the rear opening of the blocking member 322 such that the ground terminal 31 will not be withdrawn.

5       The push rod 4 is a button member; before the rod latch 41 under the push rod 41 is connected to the latch groove 321, the rod latch 41 is connected to a resilient member 42 such as a spring, and a support 44 is protruded from both sides of the upper rod wall 43, and a press button 45 is disposed on the rod wall 43. The rod latch 41 and the positioning channel 171 are preferably but not limited to the shape  
10      of a cross.

If it is necessary to push out the ground terminal 31, the push rod 4 is pressed downward, so that the rear side of the positioning channel 171 compresses the resilient member 42 and the two support members 44 press the inner wall of the guide channel 17, and then the press button 45 is pushed forward such that the  
15      ground terminal 31 is gradually extended out from the ground wire hole 19 until the two support members 44 reach the front of the positioning channel 171 and are extended by the resilient member 42 and latched into the positioning channel 171. Then, the live and neutral terminals 21, 22 are bent downward to turn round at 90 degrees and then erected vertically under the two terminals 18. The two press  
20      latches 233 at the interior of the rear section are pressed on the rear side of the T-shaped blocking member 322, so that the ground terminal 31 will not be withdrawn. The first preferred embodiment of the invention does not need to purchase an additional adaptor or cut the ground terminal off to meet the requirements of adapting the 2-terminal connection or the 3-terminal connection.

25      The present invention further comprises a latch structure 5 installed at the opening above the foregoing ground wire hole 19 and a blocking plate 511 at one end of a contractible member 51 being extend out of a plate groove 521 of a seal lid 52, and accommodated inside. An aslant surface 512 is protruded from another end of the contractible member 51, and a resilient member 513 such as a spring is

installed on the end surface. The other end of the resilient member 513 presses a stop latch 522 protruded from the seal lid 52, and the a lid arc 523 is formed on the lid corresponding to the ground wire hole 19 for allowing the ground terminal to be extended outside.

5        In FIGS. 3a to 4b, if a user pushes the ground terminal 31 out according to the aforementioned procedure, the sliding member on the lateral side of the base 323 pushes the aslant surface 512 and compresses the resilient member 513, such that the blocking plate 521 is withdrawn from the plate groove 521 into the seal lid 52. Then, a terminal channel 18 is opened to turn the live terminal 21 and the neutral  
10      terminal 2 round at 90 degrees as shown in FIGS. 3 and 4c. If it is necessary to withdraw the terminals, the live terminal 21 and the neutral terminal 22 are turned round in the reverse direction. After the press latch 233 and the blocking member 322 are detached (as shown in FIG. 4d), the push rod 4 are pressed to withdraw backward, so that the aslant surface 512 of the contractible member 51 extends the  
15      blocking plate 511 from the plate groove 521 by the extension of the resilient member 513, since the sliding member 323 is separated to shut a terminal channel 18 as shown in FIGS. 2 and 4e. The second preferred embodiment of the invention discloses a connector, wherein the ground terminal 31 must be pushed out before being used, and the ground terminal 31 is withdrawn into the main body 1 after the  
20      ground terminal is stored, and thus the live terminal 21 and the ground terminal 22 cannot be used individually by themselves. Such arrangement complies with the requirements of the safety specifications for the 3-terminal connector in most countries, and the present invention is definitely a great novel idea.

25        In summation of the above description, the present invention enhances the performance of the conventional structure, and further complies with the patent application requirements and is submitted to the Patent and Trademark Office for review and granting of the commensurate patent rights.